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"Don't be too proud of this technological terror you've constructed"

The influence of gender and in-group identification on transhumanist orientation

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Abstract

Transhumanism is a school of thought that promotes the enhancement of humanity through technological intervention (e.g., cloning, gene therapies, uploading one's mind to a computer, nanotechnology). Due to its aims of altering evolutionary processes (Bostrom, 2005), transhumanism is highly controversial (Sinicki, 2015). The ideology finds support from younger men, as well as those engaged in science-fiction literature (Gangadharbatla, 2020; Koverola et al., 2022). The present study aimed to investigate the role of gender and specific science fiction fan identities as predictors of transhumanism in three different samples of fandoms affiliated with science-fiction (e.g., anime fans, furries, and *Star Wars* fans) as well as in a control sample of college students. Participants (N = 6840) responded to a novel measure of transhumanist orientation in either an online or in-person survey. The findings indicated that men were the most likely to endorse transhumanism, as were fans of *Star Wars* and furries. Overall, the present study supports theorizing that transhumanism may be an influential motif in the science-fiction genre, as well as an appealing ideology for men.

Keywords: transhumanism, masculinity, *Star Wars*, fandom, in-group, social identity theory

1. Introduction

The desire to escape the fate of mortality is a hallmark of the human condition (Becker, 1973; Burke et al., 2010; Pyszczynski, 2019; Pyszczyski et al., 2015); religions, and philosophical traditions have

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developed and grown over time to promise adherents a chance at either an afterlife or sometimes even eternal life. However, as traditional religious structures break down in the 21st century, new movements have developed out of pop culture to satiate the morality salience of the masses (Possamai 2003, 2005; Possamai & Lee, 2011). While some movements have been described as "hyper-real religions," which derive their devotion directly from popular media (e.g., *Star Wars*), other have taken the form of a more holistic philosophical projects, which draw inspiration from these media and technological advances to create a vision for humanity's future (e.g., transhumanism).

Previous theoretical work has described the transhumanist project as highly gendered (Haraway, 1985) and heavily tied to the genre of science fiction (Geraci, 2007, 2011), which has found preliminary support in the empirical literature (Gangadharbatla, 2020; Koverola et al., 2022); however, there exists no consensus in what an assessment of transhumanist orientation looks like beyond a loose collection of techno-futurist endorsements by participants. Additionally, there have been no empirical investigations of transhumanist endorsement within the context of a specific science-fiction fandom. The present research aimed to accomplish the following: (1) develop a reliable scale of transhumanist orientation; and (2) investigate the interaction between gender and fandom membership of transhumanist orientation. The findings of this research will help to standardize future studies in transhumanist beliefs, as well as shed light onto the acceptance of transhumanist thought in the general public by contextualizing it through the lens of fan studies.

2. Transhumanism, posthumanism, and philosophical diversity

Transhumanism and its related philosophical movements present various definitions of what it means to be human, as well as what it would mean to evolve out of our current state of humanity. For example, transhumanism proper tends to advocate for the development of technologies to enhance life expectancy, intelligence, physical ability, and emotional regulation, as well as decrease disease and suffering associated with the human condition (Manzocco, 2019). Further, transhumanists tend to endorse the premise that humanity has a right and a responsibility to be active members in evolutionary processes, which ultimately would lead to the creation of the "post-human," or a species of human which has transcended the bodily limitations of our current experiences of life (Bostrom, 2005). To achieve this end state, transhumanists argue for the individual right to "morphological freedom," or the absolute freedom to alter one's body to improve physical appearance, capacities, or cognitive abilities within the confines of not harming others (Earle, 2021). Ultimately, the transhumanist position is to pursue the create of The Singularity, a digitally mediated ecosystem for the post-humans of the future to inhabit perpetually.

The term transhumanism was originated by Julian Huxley in 1957, whereby he argued for a grand mission of humanity to become the "managing director" of our own destiny and to become more self-actualized beings committed to education, beauty, and spirituality. Some authors contend that tendencies towards transhumanist thought have been present since the dawn of humanity and its urges to reach beyond the limitations of its mortal condition, while others (Bostrom, 2005) connect the beginning of transhumanism to the technological progress of the 1980s that enabled radical alterations in human behavior and cognition. As identified by Hauskeller (2016), the work done to define what is *transhuman* in the postmodern era quite neatly parallels the development of the construct of *human* in the early modern era. Extrapolating from scientific optimism and technological progress, transhumanism (and humanism in general) hopes to explain what humans are and where humans are going, or rather, what humans are to become according to a mythic, shared evolutionary imperative.

To best rise to the imperative, transhumanists seek to use 21st century technological advancements to bridge the gap between what humans are and what they can be. Specific technologies currently showing promise for progressing a transhumanist agenda include cloning (Morales, 2009), gene therapy (Uzomah, 2022), uploading one's mind to the internet via a computer or silicone-based interface (Benedikter et al., 2017), and nanotechnology for a wide array of medical, neuroscientific, and engineering applications

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(Kreowski, 2019). These technologies, and the ideology which synthesizes them into a coherent philosophical project of transhumanism, ultimately strive to develop a "post-human," which will transcend the corporeal form and begin the next phase of human evolution. According to this view, those with the means to augment themselves will be able to make highly efficient, permanent, and far-reaching improvements to the human-being that could improve not only the current generation, but every succeeding generation. This process would ultimately result in the genesis of a new species composed of an admixture of the organism and technology.

Transhumanism has thus far been painted broadly, as variants of the school of thought have emerged to complicate the aims and methods of the more mainstream philosophy. From the Marxist perspective, scholars have considered the similar themes between the aims of socialism and transhumanism, namely the rejection of the reification of an essential natural order to explain the human experiences of suffering (Steinhoff, 2021). However, Noonan (2021) critiqued the idea that Marxist and transhumanist aims are compatible, despite sharing a general agreement that humans are active agents in their environments and their future is unbound from metaphysical assumptions of the "natural order of things". While Marxists aim to see the emergence of socialism via the transformation of society as a whole to end the suffering caused by capitalism, transhumanism pushes for the total transformation of the human to transcend society into a hyper-individualized existence under capital.

Despite these differences, accelerationism emerged after the global financial crisis in 2008 as a means to prepare for a foretold, post-capitalist future. Srnicek and Williams (2013) outlined that the technological advancements of capitalism should be encouraged and leveraged by Marxists as a means to begin the process of collective self-mastery to develop a society after the inevitable fall. In a similar vein, Bastani (2019) argued that through technological advancements, Marxists could create a "post-scarcity" economy, whereby humans can be released from cohesion to work. However, Noonam (2021) cautioned against salvation by capitalist-technology, as transhumanism's promise of freedom may actually be alienation through the dissolution of the material world and human connection.

If transhumanism can only exist as a capitalist project, then the question for capitalists become an issue of *how* humans are to transcend our mortal bodies (Armesilla Conde, 2021). For libertarian, social Darwinist transhumanists, the means are offered up to the free-market to decide what technologies should be developed and who should have access to them (Noonan, 2021). Alternatively, social-democratic transhumanists are concerned with the equitable access of technologies to all people (Hughes, 2004). Scholars like Vita-More (2008; 2019) have demonstrated a desire to build an ethical transhumanism, which centers human experiences and prioritizes the self-actualizing potential of technologies to extend life and create a better world. From these perspectives, one can surmise that despite a shared interest in utilizing technology to transcend humanity into a post-human age, there is significant variability in the purpose and process of change.

While transhumanists have centered the use of technologies to reach the end state of "post-human," scholars have already started posthumanism as a theoretical lens to understand narratives like "humanity" and "progress," which are often assumed to be universal and linear (Haraway, 1985). Posthumanism posits that transhumanism is western-centric, which does not adequately account for the many potential paths into which evolutionary pressures may force us. This results in what Sorgner (2014) refers to as an "anthropological fragmentation" due to "perspectivism," which refers to different human groups having different views and values about what it means to be human and improve themselves, rather than subscribing to an overarching "transhumanist" narrative. Thus, the "Singularity" might just be singular in its cultural conception, whereby "transhumanism" can be better described as "trans-Westernism," which prioritize the western man's transcendence over the species.

Further, there is an important gendered tension to the trans- and posthuman discourse. One can view transhumanism as reinforcing masculine and Western notions of self-efficacy and rational certainty. Posthumanism promotes an open, non-prescriptive notion of being that some, such as Sorgner, go as far as calling a "fragmentation of the former unified subject;" for feminist posthumanists, this fragmentation

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was already present in the division of society by gender. Haraway's (1985) turn towards the posthuman has been employed not as an escapist, utopian paradigm, but rather for liberatory feminist ends that seek to undermine "dichotomies between mind and body, animal and human, organism and machine, public and private, nature and culture, men and women, primitive and civilized…" (p 205); in other words, the very dichotomies that transhumanist thought relies on to fuel its notions of progress.

Yet, feminist scholars have also begun to theorize gendered implication of a successful transhumanist project. For example, DeBaets (2011) argued for a feminist technorealism, aligned with social-democratic transhumanist thought, which could utilize a measured, systems approach to technological advancements, while also supporting the shared principles of personal freedom and bodily autonomy. On the other hand, scholars have also considered the outcomes of transhumanism to be a dissolution of the gender binary and sexed bodies (thus the end of sexism), should public institutions begin developing ethical policies toward that end (Reverter, 2022). However, as Ferrando (2014) identified, technological imaginings are associated with the masculine and more work needs to be done to deconstruct the binary of man/woman. Technology may not be able to solve our problems, only enhance our choices.

Taken together, transhumanism and posthumanism present a complex web of propositions regarding the meaning of being human, the role of technology and social institutions in reducing or eliminating suffering, and the means by which humans can transcend our current state. Transhumanism in particular centers technological advancement to achieve the desired end goal of reducing suffering and pursuing a grand adventure to push humanity toward a utopian future, while posthumanism tends toward deconstructing western binaries of power, which inform the concept of what it means to be human. Despite variance in transhumanist thought, the present research aimed to synthesize a set of core beliefs of transhumanists into a reliable measure for future research to utilize when exploring questions related to life extending and enhancing technologies.

2.1 Transhumanist popularity

It is as of yet empirically unclear what factors, such as gender alignment, would draw someone to endorsing transhumanism in the first place or what underlying beliefs and assumptions may unite the school of thought. Among the general public, people are generally unaware of transhumanism and when informed, they often respond with opposition (Sinicki, 2015). Much of the past research on endorsement of different aspects of transhumanist ideas has primarily focused on how conservative moral dispositions tend to negatively predict techno-futurism and enhancement technologies (Laakasuo et al., 2018; Laakasuo et al., 2021; Koverola et al., 2020a; Koverola et al., 2022). For example, disgust attitudes tend to predict negative perceptions of using mind upload technology or neural implants to improve cognitive performance. This suggests that people who are more conservative tend to be averse to these technologies. Other research has indicated that there is not a conspiratorial element to rejecting transhumanist technologies (Lantian & Rose, 2022), but that the essential concerns about such technologies are in part due to the suspicion of the ways the technology can be used by corrupt governments and corporations and ultimately increase social inequality (Sinicki, 2015). Thus, rejection of transhumanist technologies is a complex web of both disgust and concern about the well-being of fellow citizens.

While there tends to be much suspicion regarding transhumanist technologies, acceptance of transhumanism has also been examined in the literature. For example, those high in the Dark Triad (and in particular, Machiavellianism) have been shown to endorse both the prospect of uploading one's mind into a digital repository and technology-mediated enhancement strategies (Laakasuo et al., 2021; Schönthaler et al., 2022). Younger men tend to support implant technology—especially if the technology is viewed as useful and easy to operate (Gangadharbatla, 2020). Furthermore, Koverola and company (2022) observed that being a "science-fiction hobbyist" reduced the disgust-oriented moral framework that negatively predicted the acceptance of brain implant technologies. These findings are relatively

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intuitive, as one of the most common motifs in science-fiction literature is the philosophy of transhumanism (Brudar & Peric, 2021).

Notably, the positive predictors of endorsing technological advancement have also tended to be associated with masculinity. According to Hartung and company (2022), the underlying factor of the Dark Triad (The D Factor), tends to be higher in men than women. Further, risk-taking behavior tends to be higher in men than women (Byrnes et al., 1999). Lastly, science-fiction, and fandom more broadly, tends to be dominated by men (Edwards et al., 2019; Plante et al., 2016; Reysen et al., 2021). However, masculinity is highly associated with both voting conservatively and support for aggressive politics (DiMuccio & Knowles, 2021), which suggests that while men may be more likely to be drawn to transhumanism, this relationship remains unclear. Based on the aforementioned research, there is reason to believe that support and opposition for transhumanism may not be homogeneously distributed throughout the population; however, based on the works of Sorgner (2014) and Harraway (1985), there does seem to be a foundational prioritization of Western concepts of masculinity, which may attract men to the philosophical camp.

2.2 Transhumanism as a religious movement

Transhumanism speaks sincerely to humans' anxieties about death in that it promotes a future where suffering and death are no longer a given, but can eliminated through technological intervention (Vita-More, 2019). Thus, transhumanism may be a significant mechanism for humans to engage in terror management (Becker, 1973; Burke et al., 2010; Pyszczynski, 2019; Pyszczyski et al., 2015). Terror management theory posits that humans are a cultural species in that we use utilize complex systems of symbols and ideologies to navigate our social environments. The ability and necessity to build and use culture is derived from our species' unique ability to predict the future and be aware of our own mortality. Thus, culture enables humans to imagine themselves as a part of something more infinite than their present, moral bodies, as well as increase their self-esteem to ward off the creeping acknowledgment of their future demise. While most the time a cultural tradition (like religion) will ease mortality salience through promises of an afterlife, transhumanism has more explicitly engaged in terror management for its adherents by activating techno-futurism as a means to escape the consequences of being a physical entity.

According to Geraci (2011), transhumanism does more than just provide a secular means of terror management, rather it explicitly engages in religious thought modeled after Judeo-Christian apocryphal literature: dualism, alienation, transcendence, and a radical neo-embodiment. Thus, it is no surprise that some religious movements have adopted their own versions of transhumanism (Armesilla Conde, 2021). For example, the Mormon Transhumanist Association and The Christian Transhumanist Association aim to synthesize religious, spiritual, and technological transformation to uphold the divine mission to work toward the renewal of creation through the creator's gift of technology and science. However, not all religious organizations are open to transhumanist thought in their pulpits, as Armesilla Conde (2021) identified, transhumanism (like Marxism) is a materialist movement dedicate to ending suffering and death, which of course would leave traditional religious structures obsolete in the event of The Singularity.

Taken together, these elements point toward a narrative of techno-futurism which adherents are to reject the moral self and embrace the coming rapture of the Singularity (Geraci, 2008, 2010a, 2010b). Thus, transhumanism has the potential to be quite potent as a movement, especially given the dominance it holds in science fiction media. Geraci (2011) articulated that science fiction media can be akin to evangelical literature for transhumanism, as it invites and challenges notions of human, the future, and the endless possibilities of where technology can take humankind. However, the authors of the present study contend that it is not merely an interest in and personal consumption of science-fiction which might

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drive transhumanist orientation in the general public, but rather the collective experiences of these media in the form of fandom.

3. Fandom

Fandoms are groups that center around a shared interest (Plante et al., 2021). The interests around which fans congregate are as diverse as fans themselves, ranging from a particular sport team (e.g., the Green Bay Packers), a TV series (e.g., *Star Trek*), a book series (e.g., *Harry Potter*), or a niche interest (e.g., furries). As a social identity, fandoms follow the same group dynamics as other group identities, including political, racial, and gender-based identities (Tajfel, 1978; Tajfel et al., 1971; Tajfel & Turner, 1979). To this end, such groups provide members with a scaffold around which group members can form their sense of self, meaning that the group and its values and norms can play a significant role in the thoughts, feelings, and behavior of its members (Turner et al., 1987).

Of the different types of fan groups which have been studied, the most presently relevant are *mediacentric* fandoms (e.g., anime fans, Jane Austen fans; Brooks et al., 2022). In media centric fandoms, group norms are informed, in part, by the media content fans in the group consume (Edwards et al., 2019; Reysen et al., 2021). For example, fans of the television show *My Little Pony* have been found to score higher in measures of empathy and prosocial behavior than members of other fan groups, these findings are associated with the show's prosocial themes being internalized by the fans and made into norms among the fandom (Chadborn et al., 2016; Gilbert, 2015; Plante et al., 2018). For the present research, three fandoms were primarily utilized to explore openness to transhumanist thinking due to the fuzzy boundaries of the nature of humans depicted in their respective media: anime fans, furries, and *Star Wars* fans.

3.1 Anime fans

Fans of anime can be broadly characterized as having an interest in Japanese manga and animation, which is expressed through a multitude of avenues: media consumption, creating fan content, attending conventions, cosplaying, and much more (Reysen et al., 2020; Reysen et al., 2021). Fans of anime are notably diverse in their interests, particularly with regard to their preferred genera of anima (e.g., Slice of Life, Mecha, Hentai, Yuri, etc.; Reysen et al., 2017); however, the average fan is characteristically a young man, who is introverted, "nerdy," whose hobbies include predominantly video games (Reysen et al., 2016). Notably, anime fans have been found to be ideologically susceptible toward the construct of global citizenship (identifying primarily as a citizen of the planet) via perceiving the group norms prescribe members to identify as such (Reysen et al., 2020). For the present research, anime fans were recruited as they demographically meet the criteria of someone who might be more inclined to endorse transhumanist beliefs, primarily male, broadly interested in technology, with a fan identity which may overlap with more science fiction heavy fandoms (via genre preferences related to futurism, mecha, space).

3.2 Furries

Furries are fans of anthropomorphic art, or art of animals with human characteristics (Plante et al., 2016). Furries are a unique mediacentric fandom in that they do not have a specific canon, rather they gravitate toward and compile art which depicts their fan interest (e.g., Disney's *Zootopia* or *Robin Hood*, Netflix's *BoJack Horseman,* the anime *Beastars*). Like anime fans, furries typically participate in media consumption, create fan content, attend fan conventions, and dress up. Furries, like anime fans, tend to follow group norms with regard to their ideological adherence; specifically, furries are particularly drawn toward animal welfare causes, which is hardly surprising given the fan interest (Plante et al., 2016).

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However, furries are notably different from other fandoms as they also develop original anthropomorphic characters called fursonas, which are used as an alter ego for furries both online and in the real world (Roberts et al., 2015). Functionally, the fursona serves to provide optimal distinctiveness, and when copied, furries react hostilely as the fursona can serve as both an important part of identity construction, but also as a representation of the furry's ideal self (Reysen et al., 2016; Reysen et al., 2020).

Furries are relevant to questions regarding transhumanism as they may represent an iteration of morphological freedom: alterhumanism. Earle (2021) categorized furries an "alterhumans," who take on characteristics of non-humans to improve the self. While the status of "alterhuman" can be considered metaphysical, as furries are not literally surgically attaching canine tails to their bodies, Gayozzo (2021) does indicate that at the Eurofurence 17 Furry Convention in 2011, there was an exhibition which explored techno-futurism as a means to create literal furries (e.g., genetic engineering, vitro fertilization, tissue engineering). Thus, it seemed pertinent to include furries in the present study, as there does seem to be a draw to transhumanist thinking in the fandom, particularly with regards to the freedom to manipulate the physical body to achieve the ideal self.

3.3 Star Wars fans

Fans of George Lucas' *Star Wars* cinematic universe are similar in several ways to the aforementioned fandoms: they engage in media consumption, participate in conventions, cosplay, and create fan content (Reysen et al., 2022). Due to the longevity and incredibly breadth of the fandom, the canon of the *Star Wars* universe have grown to include several movies, television shows, books, animated series, videogames, and some (at the risk of being controversial) fan generated content (Consalvo, 2009). Davidsen (2016) argued, in his analysis of the *Star Wars* fandom, that the works of George Lucas have been mythologized and actively encourage fans to not only immerse themselves in the fictional world, but to imagine new ways of being in the "real world" based on the elements in the galaxy, far, far away (Brudar & Peric, 2021). Similar to furries, *Star Wars* fans are unique in that not only to do have an immersive canon to engage with, but they also have produced from the fandom a hyper-real religious movement.

Hyper-real religious systems are metaphysical belief systems that emerge from popular culture and either supplant traditional religious structures (e.g., pagans who use the works of H. P. Lovecraft as occult canon; Steadman, 2015) or influence them (e.g., Christians who are influenced by *The Da Vinci Code*; Possamai 2003; Possamai, 2005; Possamai & Lee, 2011). One example of a particularly well developed hyper-real religion has emerged from the *Star Wars* fandom—Jediism. Once thought to be a large-scale, memetic prank during the United Kingdom census, the Jedi movement has developed into a formal religious structure, with temples located around the world (Possamai & Lee, 2011). It is plausible that transhumanist elements within the canon (e.g., Darth Vader, General Grievous, anthropomorphized droids) of *Star Wars* might manifest in the ideologies of fans. Geraci and Recine (2014) speak to this through their investigation of the video game *Star Wars: The Old Republic*, where the game itself operates as a virtual space to educate players in political philosophy.

Considering the work of Geraci (2008, 2010, 2011), *Star Wars* can be considered evangelical literature for transhumanism, as it engages fans with a universe of possibilities where technology can make, re-make, and augment the humans of the future. However, despite the empirical findings of individuals who engage in science-fiction hobbyism predicting techno-futurism (Gangadharbatla, 2020; Koverola et al., 2022), the authors contend that the collectivism of fandom provides the memetic power necessary to take science-fiction from an individual commodity to conformity to group ideological norms (Chadborn et al., 2016; Gilbert, 2015; Plante et al., 2016, 2018; Reysen et al., 2020). Thus, the *Star Wars* fandom was of prime interest when considering the influence fandom has on transhumanist orientation.

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4. The present research

The purpose of the present research was to conceptually replicate and extend prior research suggesting that the distribution of support for transhumanism is non-random in the population and, instead, can be predicted demographically and by a person's fan interests. Specifically, we assessed the extent to which gender and being a member of a specific science fiction (and science-fiction adjacent) fandom predicts one's degree of support for transhumanism. Using a novel measure, we assessed support for transhumanism in a sample of college students, anime fans, furries, and *Star Wars* fans. Based on the prior research regarding the influence the canon of mediacentric fandoms has on the ideologies of fans (Chadborn et al., 2016; Edwards et al., 2019; Gilbert, 2015; Plante et al., 2016; Plante et al., 2018; Reysen et al., 2021; Roberts et al., 2015), as well as the indications that young men and those with an interest in science-fiction predict positive attitudes towards transhumanist technologies (Gangadharbatla, 2020; Koverola et al., 2022), we hypothesized that:

H1: Men would demonstrate a higher endorsement of transhumanist orientation than non-men.

H2: Men in the *Star Wars* fandom would demonstrate a higher endorsement of transhumanist orientation than men of other, science-fiction adjacent fandoms, as well as a control sample of non-fan college students.

5. Method

5.1 Participants and procedures

After receiving ethical approval through the Texas A&M University-Commerce IRB, participants were recruited for the present study. After affirming consent, the participants completed a basic demographic section and then completed a novel measure of transhumanism. At the completion of the study, the participants were debriefed and thanked for their participation.

Participants (N = 6840; M_{age} = 25.32, SD = 7.25) were recruited from multiple sources: online fan communities, in-person fan conventions, and at a regional, university in east Texas. Participants were recruited specifically for their involvement in the anime fandom (n = 4770), the furry fandom (n = 1507), the *Star Wars* fandom (n = 236), or as undergraduates (n = 327).

The majority of participants were people of color (POC; 65.7%) and the gender distributions was: cisgender women (18.1%), cisgender men (66.7%), transgender women (3.3%), transgender men (1.9%), genderqueer/nonbinary (7.7%), or other (2.2%). For the purpose of the present study, the participants were recoded into a binary variable of "men" (n = 4692) and "not men" (n = 2148), with the "men" category including both cisgender (97.2%) and transgender men (2.8%). Lastly, the participants identified their sexual orientation: gay/lesbian (8%), straight/heterosexual (56.4%), bisexual (14.7%), pansexual (6.8%), asexual (5.5%), demisexual (2.7%), "I don't know" (3.3%), and "something else" (2.6%).

5.2 Measure

5.2.1 Transhumanist orientation

After a review of the philosophical literature on transhumanism, a five-item, Likert-type scale was constructed to measure participants' level of transhumanist beliefs from an initial list of ten items. The ten items were reduced to five via a principle component analysis for each sample (Table 1) and a theoretical reflection on the literature to assess the appropriateness for each item's inclusion into the final measure (see Koverola et al., 2022; Laakasuo et al., 2021; Manzocco, 2019). The participants were asked to rate each of the items on a 7-point scale, where 1 = *strongly disagree*, while 7 = *strongly agree*. Scores were averaged across the five items to compute a composite of transhumanist orientation (α = .87; Table 2 for the inter-correlations of the items; see Appendix A for the full measure).

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Table 1. **Factor loadings of transhumanist orientation by sample**

Item	Anime	Furry	University	*Star Wars*
1	.80	.78	.78	.85
2	.82	.81	.74	.82
3	.79	.74	.75	.78
4	.84	.84	.85	.75
5	.79	.78	.76	.76
Eigenvalue	3.26	3.14	3.03	3.15
Variance	65.11	62.49	60.54	63.02
α	.87	.85	.83	.85
Mean	4.08	4.50	2.89	4.77
SD	1.38	1.50	1.27	1.41

Note. Each analysis was conducted using a principle component analysis with oblimin rotation.

Table 2. Five-item transhumanist orientation measure descriptive statistics and correlation matrix

Items	*m*	*SD*	1	2	3	4	5	6
1. Support cloning to extend life	3.37	1.89						
2. Use gene therapies to ward against aging	4.31	1.93	.64					
3. Upload one's mind to a supercomputer before death	3.65	2.02	.60	.54				
4. Use nanotechnology to enhance human abilities	4.59	1.82	.54	.60	.55			
5. Use technology to evolve humankind	4.90	1.89	.48	.53	.49	.71		
6. Transhumanist Orientation	4.17	1.54	.80	.82	.79	.84	.79	

Note. All correlations were significant at $p < .001$

6. Results

To test the two hypotheses, a 4 (sample: anime fan, furry fan, Star Wars fan, and student sample) X 2 (gender: men and not men) two-way ANOVA was conducted (Table 3). The analysis indicated a

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statistically significant interaction effect for fandom and gender: $F(3, 6832) = 8.04$, $p < .001$, $\eta_p^2 = .004$. There was a main effect for sample $F(3, 6832) = 89.19$, $p < .001$, $\eta_p^2 = .04$, and men demonstrated a significantly higher transhumanist orientation than participants who were not men: $F(1, 6832) = 29.02$, $p < .001$, $\eta_p^2 = .004$. Due to the significant results of the interaction between fandom and gender, a Bonferroni post-hoc analysis was conducted to assess comparative differences between the samples as a whole, as well as of men across the different samples, and between men and non-men within the samples.

Table 3. Means and standard deviations of transhumanist orientation by fandom and gender

	n	*m*	*SD*
Anime Fans	4770	4.12	1.52
Anime Fans-Men	3576	4.24	1.50
Anime Fans-Not Men	1194	3.74	1.52
University Students	327	2.89	1.27
University Students-Men	66	3.32	1.46
University Students-Not Men	261	2.78	1.19
Star Wars Fans	236	4.77	1.41
Star Wars Fans-Men	130	5.00	1.34
Star Wars Fans-Not Men	106	4.48	1.39
Furries	1507	4.50	1.50
Furries-Men	920	4.52	1.48
Furries-Not Men	587	4.47	1.53

Note. Transhumanist orientation was measured on a 7-point Likert-type scale

Star Wars fans demonstrated the highest transhumanist orientation compared to college students ($t = 11.95$, $p < .001$) and anime fans ($t = 7.41$, $p < .001$, but did not differ from furries ($t = 2.29$, $p = .131$). Similarly, furries were significantly higher on transhumanist orientation than university students ($t = 13.19$, $p < .001$) and anime fans ($t = 10.89$, $p < .001$). These results confirmed that men in the *Star Wars* fandom demonstrated a higher level of transhumanist orientation as compared to other groups, with the exception of furries, who also reported a significantly higher transhumanist orientation.

Additionally, men in the *Star Wars* fandom reported a higher level of transhumanism compared to men in the university student sample ($t = 7.48$, $p < .001$), anime fans ($t = 5.71$, $p < .001$), and furries ($t = 3.42$, $p = .02$). Further, a within-group analysis revealed that when compared to non-men in each sample, only the men in the anime sample scored significantly higher on transhumanist orientation than their counterparts ($t = 9.69$, $p < .001$), while there were no differences between the genders for university students ($t = 2.62$, $p = .25$), furries ($t = 0.64$, $p = 1.00$), and *Star Wars* fans ($t = 2.68$, $p = .21$).

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7. Discussion

The present study aimed to conceptually replicate and extend prior research suggesting that demographic and fan interest variables may contribute to a person's support for transhumanism. Specifically, we tested the hypothesis that men, particularly those in the *Star Wars* fandom, would be the most likely to identify with transhumanism. The present findings largely support the hypotheses in that, across samples, men were found to endorse transhumanism more than others, a finding also consistent with prior research (e.g., Gangadharbatla, 2020). However, through post-hoc analyses within-samples, only men in the anime sample were significantly higher in transhumanist orientation than their counterparts, where all other samples were similar. Furthermore, in-line with our second hypothesis and with research by Koverola and colleagues (2022), we also found that *Star Wars* fans endorsed transhumanist more than both university students and anime fans. However, both *Star Wars* fans and furries demonstrated similar endorsement of transhumanist orientation. The present study also represents the first use of a measure of transhumanist orientation that is general enough to be employed in future research on this topic.

7.1 Transhumanism and group dynamics

7.1.1 Gender

The present findings found that, above and beyond fandom identification, men were also more likely to endorse transhumanist orientation than non-men; these findings are in-line with past research by Gangadharbatla (2020). As discussed in the introduction, many of the predictors of endorsing transhumanism are theoretically connected to elements of masculinity. For example, the D factor is associated both with radical technological alterations, as well as masculinity (Hartung et al., 2022; Laakasuo et al., 2021; Schönthaler et al., 2022). Additionally, aspects of risk-taking behaviors can be associated with both an openness to transhumanism, as well as masculinity (Byrnes et al., 1999; Gangadharbatla, 2020).

Additionally, the construction of transhumanism as an ideological project relies heavily on Western notions of masculinity (e.g., rationality, self-sufficiency, progress; Sorgner, 2014). These elements may play a role in the attraction men experience toward transhumanist thinking, as it reaffirms normative beliefs about men in Western contexts and provides an explicit form of terror management for men who are concerns about their place in the 21st century; however, these are postulation for future research. The present findings broadly indicate that transhumanist orientation may exist as a point in a larger ideological system of masculine identity by reaffirming the masculine draw of transhumanist thinking.

7.1.2 Fandom

Like other social identities, fandom members both contribute to, and are influenced by, group norms and expectations (Tajfel, 1978; Tajfel et al., 1971; Tajfel & Turner, 1979). These norms foster group harmony and create a stable sense of self for group members. In the case of mediacentric fandoms, the content of these norms is influenced by the content of the media they organize around (Chadborn et al., 2016; Plante et al., 2018). In the case of *Star Wars* fans, the content of the canon demonstrates explicit motifs of transhumanism (i.e., the cyborg Darth Vader; Brudar & Peric, 2021). Additionally, the canon of *Star Wars* may also be an active form of transhumanist propaganda (Geraci, 2008, 2010, 2011), which may lead to higher endorsement of transhumanist orientation, as fans are given a simulacrum to question what it means to be human and envision new ways of being (Davidsen, 2016). The collective imagining of the future possibilities would theoretically create a group norm of transhumanist imaginings, which fans feel compelled to follow (in a similar way anime fan align with global citizenship identity).

The present study, while finding support for this hypothesis, also suggests that *Star Wars* fans may not be the only ones to endorse transhumanism: Members of the furry fandom were equally likely to agree with expanding the human experience through techno-futurism. One reason for this could be the conceptual overlap between furries and general science-fiction enthusiasm, as Plante and company (2016)

reported that furries tend to also engage in other leisure activities, such as gaming, music, and consuming science-fiction literature. Similar findings have been reported in the anime fandom (Reysen et al., 2021), especially with regard to fans of the mecha genre of anime. These findings, consistent with Koverola and company (2022), could explain why furries and anime fans also strongly endorsed transhumanist orientation, more so, at least, than the undergraduate sample.

Yet, this does not explain why furries were on par with *Star Wars* fans, while anime fans were far less likely to endorse transhumanist orientations. Drawing from the work of Earle (2021) and Gayozzo (2021), furries may be uniquely positioned in transhumanist discourse via the fursona as an expression of morphological freedom. Furries, while being science-fiction adjacent, engage in identity play through metaphysically altering the self to take on elements of their ideal self. This is a far more explicit engagement of applied transhumanism as compared to anime fans, who may or may not be just as similar to other science-fiction fandoms. Regarding anime fans, it may be important to consider the genre preferences of the fans when measuring their attitudes toward transhumanism.

7.2 Limitations

While the present study provides important insights into the relationship between group identity, gender, and transhumanist orientation, several important limitations contextualize our findings. The study recruited participants from English-speaking, online fan communities, in-person fan conventions, and a regional university in east Texas. However, the sample was not checked or controlled for geographic distribution and only four specific fandoms were investigated; thus, these self-selected participants may have a different level of engagement with transhumanism than the general population. For example, the student sample originated from a particularly conservative part of the United States, which might explain the low levels of transhumanist orientation. Further, the student sample was not asked about fandoms to which they belong, which might have provided further insights into their engagement with transhumanist philosophy.

Additionally, the binary categories imposed on the sample, of “white” and “non-white,” and “men” and “not men,” are not inclusive of diverse race and gender identities, but rather, in the very act of binarization, remain rooted in ways of analysis that privilege historically white/Euro-American, masculine worldviews (Crenshaw, 1991; Hill-Collins, 1990). Future research could seek to recruit and methodologically account for a more diverse sample from a variety of communities, cultural backgrounds, gender identities, geographical locations, economic classes, languages, fandoms, and niche interests. In tandem with this limitation, the participants in the study were mostly men, thus the findings may not be fully representative of transhumanist thought more broadly.

While the study found an interaction between fandom and gender when predicting transhumanist orientation, the study did not investigate the underlying mechanisms thought to drive these effects. Variables such as education level, socioeconomic status, culture, geographic location, proficiency with science and technology, to name just a few, might play an important role above and beyond the variables presently assessed and may account for, or moderate, the observed associations.

A final limitation of the present study involves the measure developed, as it is worth asking whether those five items were able to fully capture the complexity of transhumanist beliefs. For example, the measure asked participants to respond to items related to techno-futurism (e.g., cloning, gene therapies, digitizing the mind, enhancements); however, there may be a more complex network of beliefs involving mortality anxiety, attitudes toward the physical body, and metaphysical beliefs about evolution which were not assessed in the present study. Additionally, further research needs to be conducted regarding the reliability and validity of the novel measure.

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7.3 Future directions

Based on the present findings, there are several avenues of future inquiry. The results of the study indicated that men in the anime sample were much more likely to endorse transhumanism than any other group in the study. Thus, future work could invest time into the ways ideology within the anime fandom is informed by content and reproduced via group norms. Further, qualitative work could be helpful in understanding how men in the anime fandom conceptualize and share transhumanist thought within their social circles. Another avenue of inquiry could be dedicated to understanding the applicability of the transhumanist orientation scale to different schools of thought in transhumanism. For example, would an accelerationist Marxist and a libertarian transhumanist endorse the measure similarly? Lastly, but not exhaustively, future work could situate the present findings within a more global, class-based context through cross-cultural methodologies. This line of inquiry could help illuminate if transhumanism is primarily endorsed within Western-capitalist countries, which could affirm a central critique leveraged by posthumanists that transhumanism is embedded in western ideals of power.

8. Conclusion

The present study contributes to the literature on transhumanism by assessing fan engagement and gender, as well as their interaction, and their association with support of transhumanism. The results indicated that men were more likely to endorse transhumanist orientation as compared to participants who were not men, which supports previous findings by Gangadharbatla (2020); however, this finding was more nuanced than predicted, as the effect might be primarily due to the differences observed in the anime fans. Further, fandoms with high science-fiction engagement, *Star Wars* fans and furries, demonstrated a higher endorsement of transhumanist orientation than anime fans and university students. The limitations of the study suggest that the findings should be seen as a starting point for further research on the complex relationships between transhumanism, fan engagement, and demographic and ideographic factors. Taken together, the present research contributes to past literature regarding transhumanism and enhancement technology by considering the role of group norms and the influence of popular culture in transmitting and endorsing ideological frameworks.

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Appendix A: Transhumanist Orientation Measure

Instructions: Please rate your degree of agreement with the following items.
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
1. use implants to improve cognitive performance.
2. use implants to improve physical performance.
3. support cloning to extend life.*
4. use gene therapies to ward against aging.*
5. support cryonics (freezing human body) to extend life.
6. upload one's mind to a supercomputer before death.*
7. support giving artificial intelligence personhood.
8. use technology to enhance oneself.
9. use nanotechnology to enhance human abilities.*
10. use technology to evolve humankind.*

Note. * = inclusion in the final 5-item measure

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